A STUDY TO ASSESS THE EFFECTIVENESS OF VENTILATOR CARE BUNDLE ON PREVENTION OF VENTILATOR ASSOCIATED PNEUMONIA AMONG PATIENTS ON MECHANICAL VENTILATOR AT SELECTED HOSPITAL, IN CHENNAI.

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ABSTRACT:

A study to assess the effectiveness of ventilator bundle on prevention of ventilator associated pneumonia among patients on mechanical ventilator at selected Hospital, Chennai using quantitative research approach with Pre experimental pre-test and posttest. The study was conducted among 60 patients on mechanical ventilator, who were selected by convenient sampling technique from the Hospital, Chennai for research setting. Demographic and clinical variables were collected by using a semistructured interview schedule and their post test level of ventilator associated pneumonia was assessed by Clinical Pulmonary Infection Score (CPIS). In experimental group the investigator provided ventilator bundle immediately after endotracheal intubation and continued for three days. There was an association in control group on prevention of ventilator associated pneumonia with their selected demographic variables such as age, sex, diagnosis, indication for intubation, Duration of patient on ventilator, Intubation done on situation, Frequency of suctioning, Personal History of smoking, diagnosis of VAP and preventive measure undertaken. Hence H2 is rejected among patients on mechanical ventilator with their selected demographic variables at $p \geq 0.05$ level. This shows that the ventilator bundle was effective in preventing the ventilator associated pneumonia among patients on mechanical ventilator.

Keywords: Effectiveness, Ventilator Bundle, Ventilator Associated Pneumonia, Mechanical Ventilation.

INTRODUCTION:

The respiratory system is the network of organs and tissues that help you breathe. It includes your airways, lungs and blood vessels. The muscles that power your lungs are also part of the respiratory system. These parts work together to move oxygen throughout the body and clean out waste gases like carbon dioxide. It is the process by which an organism exchanges gases with its environment. The respiratory tract is the path of air from the nose to the lungs. It is divided into two sections: Upper Respiratory Tract and the Lower Respiratory Tract. Included in the upper respiratory tract are the Nostrils, Nasal Cavities, Pharynx, Epiglottis, and the Larynx. The lower respiratory tract consists of the Trachea, Bronchi, Bronchioles, and the Lungs. The organs of the respiratory system make sure that oxygen enters our bodies and carbon dioxide leaves our bodies. The respiratory system plays a vital role in the inhalation and exhalation of respiratory gases in the human body. Lung and breathing problems are common and 5th leading cause of death in world wide. In India, the respiratory disorder stands in the 3rd place including chronic obstructive pulmonary disorders, asthma, pneumonia, tuberculosis, interstitial lung diseases etc. When a patient is unable to maintain a patent airway, adequate gas exchange or both, more invasive support with intubation and mechanical ventilation is needed to save the life of patient. Mechanical ventilation is a method to mechanically assist or replace spontaneous breathing. It is also the process of a using of an apparatus to facilitate the transport of oxygen and carbon dioxide between the atmosphere and the alveoli for the purpose of enhancing pulmonary gas exchange. Roman physician Galen has been the first to describe the mechanical ventilation. Mechanical ventilation is indicated when the patient's spontaneous ventilation is inadequate to maintain life. It is indicated for physiologic and clinical reasons. Physiologic objectives include supporting cardio pulmonary gas exchange, increasing lung volume and reducing work of breathing.

Mechanical ventilation has become the most used mode of life support in medicine today. Mechanical ventilation is often a life saving, but like other interventions, it is not without complications. Physiologic complications associated with mechanical ventilation include ventilator induced lung injury, cardiovascular compromise, gastrointestinal disturbances, pneumothorax and the most importantly ventilator associated pneumonia. Pneumonia is the second most common nosocomial infection in the world and is a leading cause of death due to hospital acquired infections. Patients in the intensive care unit (ICU) are at risk for dying not only from their critical illness but also from secondary processes such as nosocomial infection. Hospital Acquired Pneumonia is the second most common nosocomial infection in critically ill patients, affecting 27% of all critically ill patients. Ventilator associated pneumonia (VAP) is a form of nosocomial pneumonia that occurs in patients receiving mechanical ventilation of within 48 hrs.

STATEMENT OF THE PROBLEM:

A study to assess the effectiveness of ventilator bundle on prevention of ventilator associated pneumonia among patients on mechanical ventilator at Selected Hospital,Chennai.

OBJECTIVES:

1. To assess the ventilator associated pneumonia among patients on mechanical ventilator in experimental and control group.

2. To evaluate the effectiveness of ventilator bundle on prevention of ventilator associated pneumonia among patients on mechanical ventilator in experimental group and control group.

3. To associate the post test score on prevention of ventilator associated pneumonia among patients on mechanical ventilator with their selected demographic variables in experimental and control group.

HYPOTHESIS:

H1. There will be significant difference in post test score on prevention of ventilator associated pneumonia among patients on mechanical ventilator in experimental and control group at $p \leq 0.05$ level.

H2. There will be significant association between post test score on prevention of ventilator associated pneumonia among patients on mechanical ventilator with their selected demographic variables in experimental group and control group at $p \leq 0.05$.

ASSUMPTION:

1. The patients on mechanical ventilator are more prone to get ventilator associated pneumonia because of accumulation of mucus secretion in the trachea.

2. Ventilator bundle may prevent the occurrence of ventilator associated pneumonia among patients on mechanical ventilator.

LIMITATION:

1. The study is limited to patients on mechanical ventilator.

2. Data collection period is limited to 4 weeks.

3. Sample size is limited to 60.

4. Patient who are admitted in Hospital

REVIEW OF LITERATURE :

1. Literature related to Ventilator associated pneumonia.

2. Literature related to Effectiveness of Ventilator care bundle on prevention of Ventilator Associated Pneumonia.
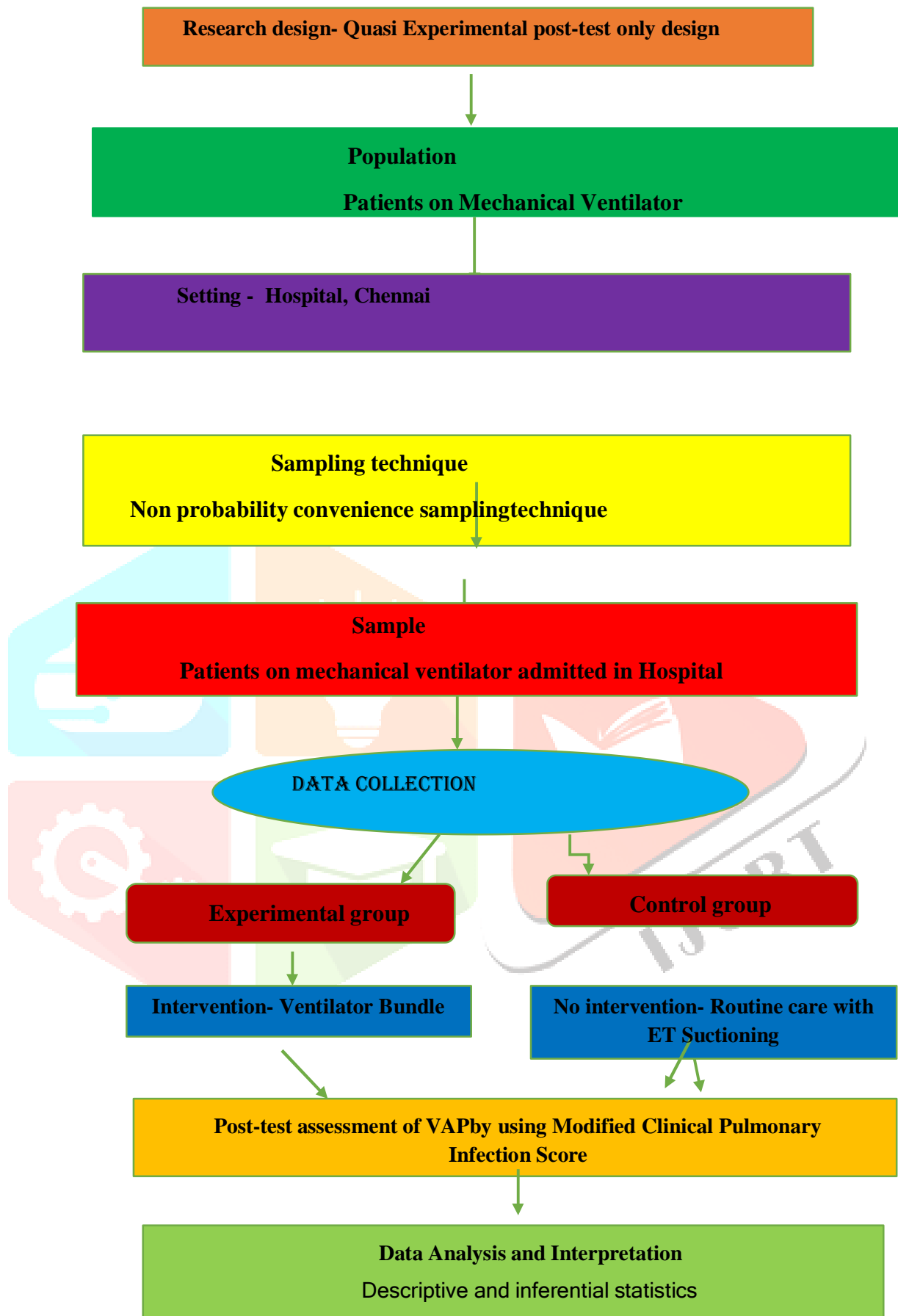
Research design- Quasi Experimental post-test only design

Population

Patients on Mechanical Ventilator

Setting - Hospital, Chennai

Sampling technique

Non probability convenience samplingtechnique

Sample

Patients on mechanical ventilator admitted in Hospital

DATA COLLECTION

Experimental group

Control group

Intervention- Ventilator Bundle

No intervention- Routine care with ET Suctioning

Post-test assessment of VAPby using Modified Clinical Pulmonary Infection Score

Data Analysis and Interpretation

Descriptive and inferential statistics

FIG:1.1 SCHEMATIC PRESENTATION

VARIABLES:

Independent Variable:

The independent variable of the study was ventilator care bundle

Dependent Variables

The dependent variable was ventilator associated pneumonia.

CRITERIA FOR SAMPLE SELECTION:

Inclusion Criteria:

- Patients with age group between 20 – 60 years.
- Patients who receive mechanical ventilation.
- Both male and female patients

Exclusion Criteria:

- Patients after 24 hours of intubation.
- Patients already diagnosed with fever, pneumonia, and ARDS.
- Patients with cervical and spinal cord injury.
- Patients already intubated from outside hospital.
- Patient Not on Ventilator

DESCRIPTION OF THE TOOL:

The tool was prepared by the investigator after an extensive study of the related literature and with the guidance of experts. The tool consists of two sections.

Section A: Demographic Variables:

This section consists of demographic variables like age, gender, education, occupation, personal history, duration of smoking.

Section B: Clinical Variables:

This section consists of clinical variables like diagnosis, risk factor, situation for doing intubation, indication for ventilator, Duration of patient on ventilator, frequency of suctioning, diagnosis of VAP, preventive measures under taken and frequency of changing the position. The baseline data were collected by using semi structured interview schedule.

Section C: Modified Clinical Pulmonary Infection Score (CPIS) for Assessing

Ventilator Associated Pneumonia:

The Clinical Pulmonary Infection Score has utility in both detecting the onset of ventilator associated pneumonia and also determining the sufficiency and adequacy of treatment. The diagnosis of ventilator associated pneumonia was generally based upon variations of the Clinical Pulmonary Infection Score originally developed by Pugin et al., in 1990.

Table – 1.1: Scoring Procedure Interpretation for Ventilator Associated pneumonia:

Score	Interpretation
0	No infection
1-4	Mild infection
5-8	Moderate Infection
9-12	Severe pneumonia

RESULTS AND DISCUSSION:

Effectiveness of Ventilator Bundle on prevention of Ventilator Associated Pneumonia among Patients on Mechanical Ventilator in experimental and Control Group.

n= 60

Group	Mean	StandardDeviation	df	Unpaired 't' value	TableValue
Experimental	4.3	2.0	58	10.8	2.4
Control Group	9.9	3.1			

*Significant at p ≤ 0.05 level

Table-1.2: Mean, Standard Deviation and unpaired 't' value on Post test Score on Prevention of Ventilator Associated Pneumonia among Patients on Mechanical Ventilator in experimental & Control group.

The above table 4.3 reveals that in post test mean score for experimental group is 4.3 ± 2.0 and in control group is 9.9 ± 3.1. The 't' value is 10.8 which is greater than the table value 2.4, significant at $p \leq 0.05$ level. Hence the research hypothesis H1 is accepted. Thus, it is evident that the ventilator bundle is effective in preventing the ventilator associated pneumonia among patients on mechanical ventilator.

CONCLUSION:

The study was done to evaluate the effectiveness of ventilator bundle on prevention of ventilator associated pneumonia among patients on mechanical ventilator at hospitals, Chennai. The result of this study showed that ventilator bundle was effective in preventing the ventilator associated pneumonia among patients on mechanical ventilator in experimental group. There was association found between the prevention of ventilator associated pneumonia with the selected demographic variables in experimental and control group. Hence research hypothesis H2 was accepted at $p \geq 0.05$ level.

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